ABSTRACT OF THE DISCLOSURE

An embodiment of the present invention employs a combination of techniques for facilitating correction of chromatic aberration in the context of a projection optical system comprising one or more refractive optical members collectively comprising two or more fluoride substances. As one such technique, a projection exposure system comprises at least two refractive optical members collectively comprising at least a first fluoride substance and a second fluoride substance, wherein MX_1 is greater than MX_2 and the design condition $0.4 < \frac{MX_2}{MX_1} < 0.87$ is satisfied, where MX_1 is the effective aperture of the surface or surfaces having the largest effective aperture among the surface or surfaces of the refractive optical member or members comprising the first fluoride substance, and MX_2 is the effective aperture of the surface or surfaces having the largest effective aperture among the surface or surfaces of the refractive optical member or members comprising the second fluoride substance. As another such technique, a projection exposure apparatus comprises such a projection optical system and a light source capable of supplying radiation for exposure having a linewidth narrower than a natural linewidth thereof.